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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/625,586

07/23/2003

Minshon J. Chiou

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01/07/2005

E I DU PONT DE NEMOURS AND COMPANY
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WILMINGTON, DE 19805

EXAMINER

TORRES VELAZQUEZ, NORCA LIZ

ART UNIT

PAPER NUMBER

1771

DATE MAILED: 01/07/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/625,586

Applicant(s)

CHIOU ET AL.

Examiner

Norca L. Torres-Velazquez

Art Unit

1771

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 February 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-19 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 July 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 21904.
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over CHIOU et al. (US 5,622,771) in view of LI et al. (US 4,916,000) and PRICKETT (US 5,853,885).

CHIOU et al. relates to articles that protect from penetration, such as stabs or thrusts from sharp instruments. (Col. 1, lines 10-12) The reference teaches a penetration resistant article consisting essentially of fabric woven to a fabric tightness factor of at least 0.75 form aramid yarn having a liner density of less than 500 dtex, a toughness of at least 30 Joules/gram and filaments in the yarn having a linear density of less than 1.67 dtex. (Col. 1, lines 32-37) The reference teaches the use of poly(p-phenylene terephthalamide) as the preferred para-aramid. (Col. 2, lines 41-42) The reference teaches that the aramid yarns must have a high tenacity combined with a high elongation to break to yield a high toughness. Toughness is also known as "energy to break", which is a combination of tenacity and elongation to break. (Col. 4, lines 14-37) The reference teaches the use of a plurality of layers. (Col. 4, lines 38-43)

It is the Examiner's interpretation that the structure of the woven fabric taught by CHIOU et al. reads on the presently claimed tightness factor, linear density of the yarns, the tenacity of the yarns. However, the reference is silent to the areal density of the plurality of flexible layers, and to the use of staple fibers in the yarns. It is further noted that while the reference teaches that

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the woven fabric has a toughness of at least 30 Joules/gram and the present invention claims a toughness (energy to break) of 8 to less than 30 Joules/gram, it is the Examiner's position that smaller values would be obvious further in view of the Li et al. reference below.

LI et al. also relates to ballistic-resistant articles. The composite comprises one or more layers and at least one of the layers comprises a network of high strength filaments having a tenacity of at least about 7 g/denier and energy to break of at least about 8 joules/gram. (Abstract) The reference teaches the use of aramid filaments. The reference teaches specific filament products that provide different properties for use in their invention. (Col. 8, lines 26-50) The reference teaches that a plurality of filaments can be grouped together to form a twisted or untwisted yarn. The filaments or yarn may be formed as a woven. (Col. 8, lines 53-56) The reference further teaches areal densities for the panels (composite) of their invention to be in the presently claimed range. (Refer to the Examples Col. 18-20)

While both CHIOU et al. and LI et al. teach the use of filaments to form the yarns, both are silent to the use of staple fibers in the construction of the yarns. It is noted that manufactured fibers are extruded into filaments that are converted into filament yarn, staple or tow. (Dictionary of Fiber & Textile Technology, KOSA, p.77)

PRICKETT relates to a woven fabric used in cut resistant garments made using a para-aramid yarn. (Col. 1, lines 4-15; Abstract) The reference teaches the use of poly(p-phenylene terephthalamide). (Col. 1, lines 47-48) The reference further teaches the use of staple fibers for use in spinning yarns. (Col. 2, lines 8-12) The spun yarns are held together by means of a twist incorporated into the yarn while spinning. Crimped staple fibers are spun on a spinning machine to yield a yarn with a certain twist. The twist helps to entangle the fibers together to form the

yarn. (Col. 2, lines 25-29) The reference further teaches that yarns with a twist factor of less than about 26 yield a soft fabric, yet cut resistant material. (Col. 3, lines 5-7) The reference further teaches the use of yarns with a yarn linear density of 150-5900 dtex and the individual staple fibers with a linear density of 3 to 6 dtex. (Col. 3, lines 19-40)

Since the references are directed to woven materials for use in applications such as protective garments, the purpose disclosed by LI et al. and PRICKETT et al. would have been recognized in the pertinent art of CHIOU et al.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to modify the woven structure of CHIOU and provide with an areal density and a wider range yarn toughness with the motivation of producing a composite article that can provide a selected level of ballistic protection while employing a reduced weight of protective material in comparison to conventional ballistic-resistant armor structures as disclosed by LI et al. (Col. 2, lines 20-25) Further, it would have been obvious at the time the invention was made to a person having ordinary skill in the art to further modify the woven structure and provide the yarns with staple fibers with the motivation of using a more economical product since it is less costly to produce yarns from staple fibers than from using continuous filament yarns of the same denier.

3. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

HOWLAND (US 5,837,623)

ZHU et al. (US 6,534,175 B1)

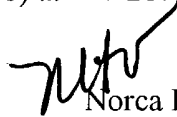
REBOUILLAT et al. (US 2004/0011088 A1)

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4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Norca L. Torres-Velazquez whose telephone number is 571-272-1484. The examiner can normally be reached on Monday-Thursday 8:00-4:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Terrel Morris can be reached on 571-272-1478. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Norca L. Torres-Velazquez
Examiner
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January 5, 2005